INSTRUCTION BOOK

INSTRUCTION MANUAL IM-1054

for

SYSTEM PROGRAMMER MODEL SC-48

HARRIS INTERTYPE CORPORATION

GATES

AUTOMATIC TAPE CONTROL DIVISION

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Please note - The following changes were made for fade additions. - CR 21 cht opened front to J11 -pins 13+14 for use as a start defeat during a fade.

For advance in news cast - Trim pulse generator switch connects pins 9+12 on connector #9 (End of message) pins 9+12

SYSTEM PROGRAMMER SC-48

SECTION 1 GENERAL DESCRIPTION

PURPOSE OF EQUIPMENT: Any automated system will require several program sources if adequate programming service is to be provided. These sources will probably include music, spot announcements, station identifications, weather information, time signals, etc. It is necessary to control the operating sequence of such sources, and cause each to be aired as desired. The purpose of ATC Programmers is to provide this control.

The SC-48 Programmer is designed for simple yet sophisticated control of an automation system. The SC-48 can control as many as nine tape sources in any combination of cartridge and reel-to-reel machines. Forty-eight thumbwheel selectors provide sequential control of up to forty-eight events. The sequence of events repeats until a change is made in the selectors, or until the Programmer is placed in the off position.

A unique feature of the SC-48 programmer is its ability to "skip" programmed events stored in the thumbwheel selectors when these events are not required to fill a program segment. An example would be a requirement to play a commercial and ID on the hour and half hour. To assure sufficient programming time during the half hour preceding the commercial and ID it would be desirable to schedule an extra selection or two of music. If the selections are not required to fill out the programming time, they are "skipped" and not used in the programming sequence. It is thus possible to pad a program time segment with "fill" music and obtain time programming without timing each program entry. The control of "skip" is inserted only when the immediately preceding programming event reaches its conclusion, therefore time of the commercial and ID is approximate. By the addition of a fade start unit and individual 25 cycle detectors on reel-to-reel sources, exact time programming can be achieved without timing each program entry with seconds accuracy.

A 25 cps sensor is contained within the SC-48 Programmer for control of reel-to-reel music sources. All audio and control connections are made by means of multi-contact plug-in connectors. Automatic Program Logging may be added to automation systems controlled by the SC-48 Programmer.

SECTION 1

General Description

INPUTS: Maximum of nine stereophonic or monophonic sources, 600 ohms, +4 dbm maximum.

SOURCE SELECTION: Maximum of nine by thumbwheel switch.

SEQUENTIAL EVENTS: Forty-eight before repetition.

TIME CORRECTION: Corrects four times an hour on 2 hour program pattern

SENSING: 25 cps, left channel only. Normally used for control of reel-to-reel sources. Silence sensing may be obtained on special order. Sensing units are plug-in modules.

POWER SUPPLIES: Separate power supplied for control relays and Sensor. Self contained.

RELAYS: Plug-in with dust covers. AE rotary stepping switch.

AUDIO OUTPUT: 600 ohms, balanced, +4 dbm maximum.

AUDITION CIRCUIT: Available at front panel headphone jack and rear chassis connector.

TIME PULSE GENERATOR: Supplied as a separate unit. Furnishes a selectable pulse with a 5 minute time base.

HOUSING: Rack mount with slide-out chassis.

DIMENSIONS: Control unit, 19 X 8 3/4 X 15 inches deep. Time Pulse Generator, 19 X 5¼ X 15 inches deep.

POWER SOURCE: 117 volts ac, 50 watts.

SECTION 2

INSTALLATION PROGRAMMER SC-48

UNPACKING AND INSPECTING: Remove all packing material and carefully lift the units from their boxes. Visually inspect for any apparent damage. Check the equipment against the packing slips. Check for proper operation of front panel controls. Any claims for damage should be filed promptly with the transportation agency. If such claims are to be filed, all packing material must be retained.

RACK MOUNTING: The Programmer Control Unit should be mounted at a level which will be convenient for operation personnel. The Time Pulse Generator is usually mounted directly below the Control Unit.

START CIRCUITS: Current reel-to-reel machines utilize START circuits of two types, (1) those requiring a momentarily closed circuit and (2) those which must be supplied a continuous RUN circuit. Either type may be used with the SC-48. Cartridge machines require a momentary START circuit. Proper straps for START terminals A-B-C must be in place for each program source. These terminals are located on the component board which is under the main chassis (see Figure 201). A1, B1, and C1 are source 1 terminals, A2, B2, and C2 source 2, etc. A strap from A to B supplies a continuous RUN circuit. B to C straps furnish a momentarily closed circuit to the source start circuit. NOTE: All units are shipped with B to C straps unless otherwise requested.

A reel-to-reel machine requiring a momentary start circuit is pulsed from the common START BUS connected to relay K15 contacts 9-5. A machine requiring continuous RUN information is supplied a circuit thru individual source relay contacts 7-11 and 8-12. In all cases a start circuit for each source is connected, thru a source connecting cable, to terminals 7-10 of input connectors J1 thru J9.

STOP CIRCUITS: Cartridge machines do not require connection to the system stop circuit. These units are equipped with internal stop circuits.

Reel-to-reel machines which utilize continuous RUN information are not connected to the system stop circuit. These units are automatically stopped as the Programmer advances to the next source relay.

Reel-to-reel machines which require a momentary START pulse will usually require a momentary OPEN circuit to supply STOP information. This stop information is available at terminals 8-11 of each source connector.

SECTION 2

Installation

A reel-to-reel machine may be occasionally encountered which requires a momentary CLOSED circuit as stop information. It will be necessary to change the STOP circuit for such sources from a set of normally closed to a set of normally open contacts of the appropriate STOP relay.

The STOP circuit of each program source should be analyzed, connected or left open as required.

SECONDARY CUE SWITCHING: The Secondary Cue (End of Message) circuit is connected to cartridge machines only. The purpose of this signal is to start the "next" source at the proper time.

Reel-to-reel machines usually utilize a 25 cps pulse at the end of a music selection to furnish "end of message" information. One Detector-Control Unit (Model SDU) usually monitors the entire system. This unit supplies the "end of message" signal for any number of reel-to-reel machines.

LOGGING INFORMATION: Logging information, furnished by the Tertiary Cue switching circuit, is connected to cartridge machines only. Reel-to-reel machines are usually not capable of supplying this information. Logging circuits are used only with systems utilizing the ATC Logging Package.

REMOTE CIRCUITS: Programmer remote connections, available at J10, are furnished primarily for general purpose use.

OVERLAP CONTROL: The SC-48 Programmer may be used with Overlap Control in a System. The wiring change for Overlap Control is made at Terminal Point TP, ie, remove jumper between TP2 and 3 and connect a new jumper between TP 1 and 2. Refer to the Overlap Control Instruction Manual for Overlap-Programmer interconnection data.

WIRING INSTRUCTIONS: All Connections are as follow.

SECTION 2

Installation

CONNECTORS J1 thru J9: J1 thru J9 are program source connectors. Pin connections are as follow:

Pin		
	1	Left Channel Audio Ground
	2	Left Channel Audio +
	3	Left Channel Audio -
	4	Right Channel Audio Ground
	5	Right Channel Audio +
	6	Right Channel Audio -
	7	Remote Start
	8	Remote Stop
	9	Secondary Cue Switching (Message End)
	10	Remote Start
	11	Remote Stop
	12	Secondary Cue Switching (Message End)
	13	Tertiary Cue Switching (Logging)
	14	Tertiary Cue Switching (Logging)

Not all types of program sources will use all the above connections. Several representative connecting cable schematics are included as a part of Section 2.

CONNECTOR J10: J10 provides circuits for remote control of various Programmer functions. Pin connections are as follow:

Pin		
	1	Relay K1 Control
	2	Relay K2 Control
	3	Relay K3 Control
	4	Relay K4 Control
	5	Relay K5 Control
	6	Relay K6 Control
	7	Relay K7 Control
	8	Relay K8 Control
	9	Relay K9 Control
	10	System Stop (See Note 1)
	11	System Stop (See Note 1)
	12	Source Start
	13	Source Start
	14	Advance
	15	Advance
	16	Battery +
	17	Ground -
	18	Not Used
	19	Not Used

Pin	20	Skip Arm
	21	Skip Arm
	22	Skip De-Arm (See Note 2)
	23	Skip De-Arm (See Note 2)
	24	Advance Disable (See Note 3)

Note 1: Terminals 10-11 must be strapped unless a remote control device is used.

Note 2: Terminals 22-23 must be strapped unless a remote control device is used.

Note 3: Terminal 24 must be strapped to terminal 16 unless a remote device is used.

CONNECTOR J11: J11 is used for all audio output connections.

Pin	1	Left Channel Audio Shield
	2	Left Channel Audio +
	3	Left Channel Audio -
	4	Right Channel Audio Shield
	5	Right Channel Audio +
	6	Right Channel Audio -
	7	Left Channel Audition Audio + (See Note 1)
	8	Left Channel Audition Audio -
	9	Right Channel Audition Audio +
	10	Right Channel Audition Audio -

Note 1: Audition outputs are unbalanced, pins 7 and 9 are ground.

CONNECTOR J12: J12 provides circuits for intra-system connections. Pin connections are as follows:

Pin	1	Decoder Ground Circuit (See Note 1)
	2	Decoder Control Circuit
	3	Decoder Pulse Circuit
	4	System Restart
	5	System Restart
	6	Skip Control Circuit (See Note 2)
	7	Skip Control Circuit
	8	Skip Arm Circuit (See Note 3)
	9	Skip Arm Circuit
	10	Fade Release
	11	Fade Release
	12	Overlap Ground -

Note 1: Terminals 1-2-3 for use in systems supplied with Automatic Program Logging.

Note 2: Terminals 6 and 7 are for use in the systems supplied with a Fade Start Unit

Note 3: Terminals 8 and 9 are for use in systems without a Fade Start Unit.

SECTION 2

Installation

PRELIMINARY TEST: Make certain a jumper is between pins 10-11 and pins 22-23 of the plug which is in J10. Connect AC power to the SC-48 Programmer. One of the red indicator lamps should be ON. Proceed as follows:

1. Press switch S50 to the ADVANCE position. The stepping switch RS1 should advance one position. The next lamp should be on and the previous lamp off. Continue advancing thru all 48 steps. RS1 should automatically step thru unused positions 49, 50, 51 and 52 if S49 is in the auto position.

2. Slide unit about half out of its cabinet. Place S52 in the ON position, S53 thru S59 in the OFF position. Press S50 to the SKIP position. RS1 should self step to the #1 position. Place S52 and S56 in the ON position. Press S50 to the SKIP position. RS1 should self step to Position 25. Press S50 to the SKIP position again and RS1 should step to the #1 position. Put S52 thru S59 in the ON position. Each time S50 is pressed to the SKIP position RS1 should advance six positions.

3. Press switch S51 to the ARM position. The arm light should be on. Press S51 to the De-Arm position, the arm light should be off. Again press S51 to the ARM position and then press S50 to ADVANCE. RS1 will advance to the next skip position and the arm light will go out.

4. Remove power from the Control Unit. Install the Sensor unit in the chassis connector J14. Re-apply power.

5. Install all program source cables in the proper connectors. Install audio output connections. Program the system.

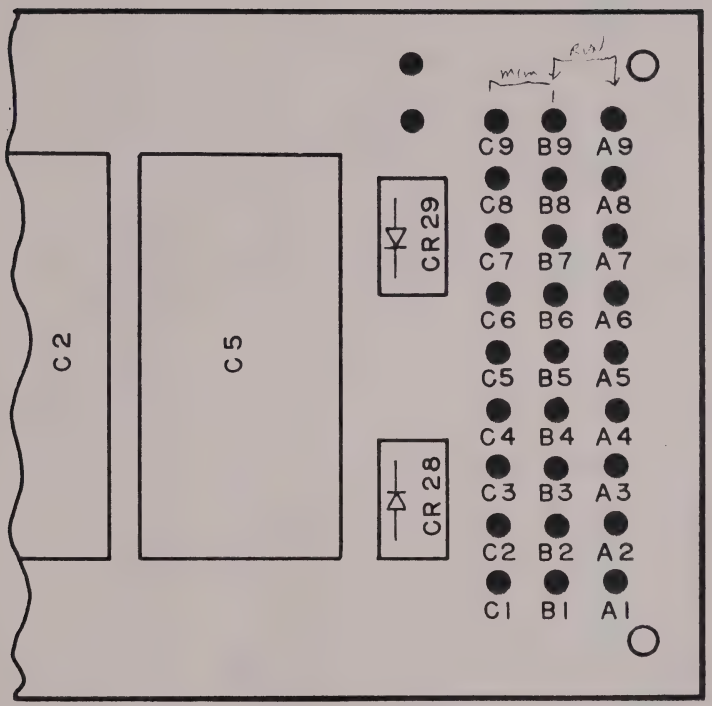
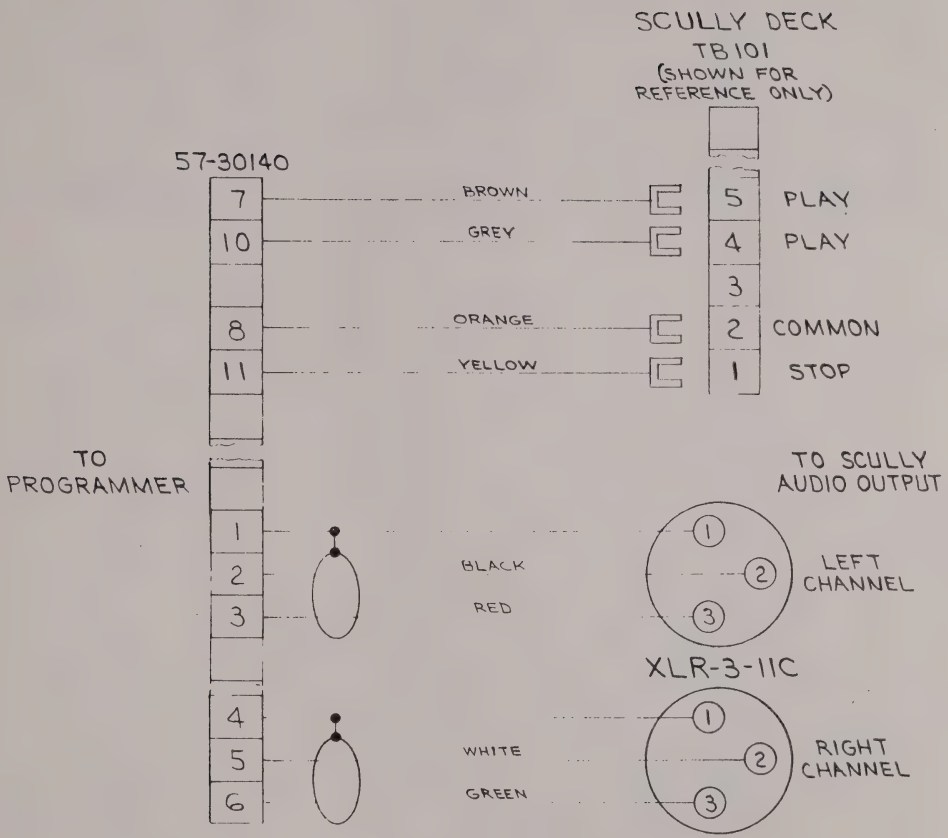
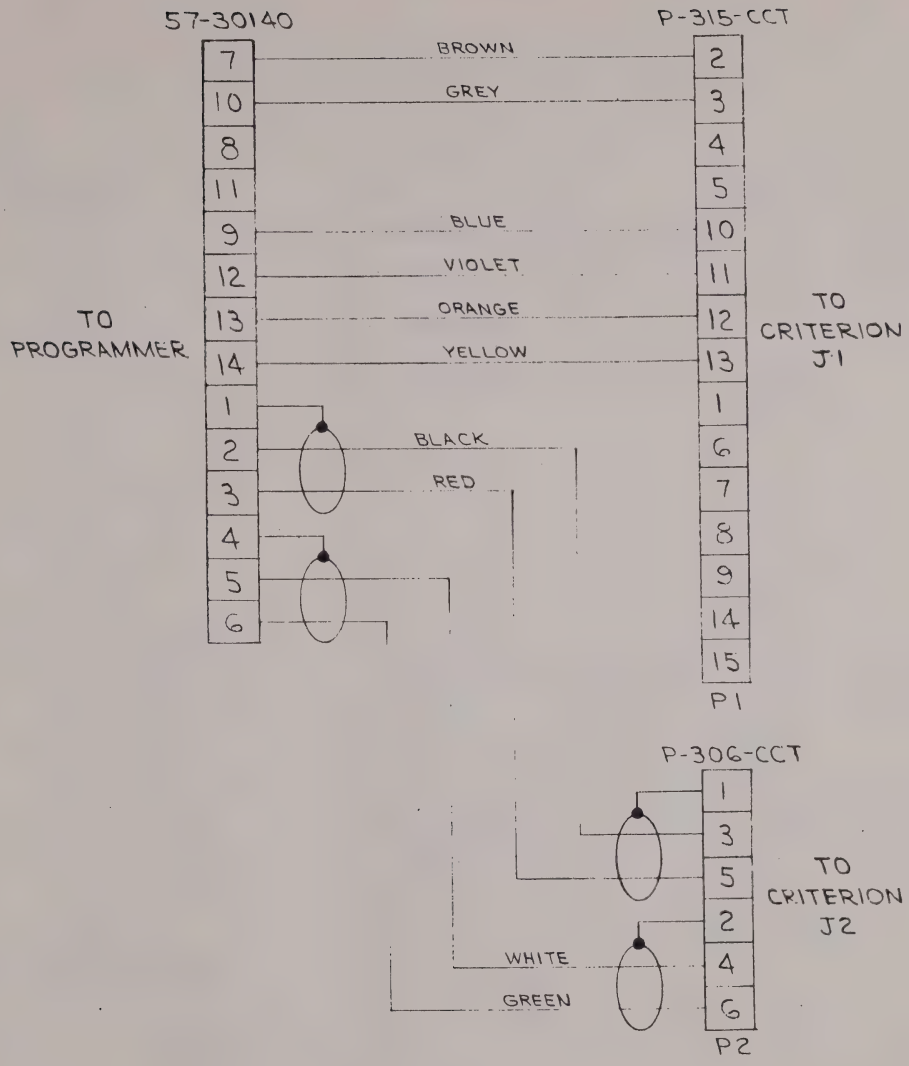

C2
C5
CR29
CR28
C9 B9 A9
C8 B8 A8
C7 B7 A7
C6 B6 A6
C5 B5 A5
C4 B4 A4
C3 B3 A3
C2 B2 A2
C1 B1 A1

FIG. 201



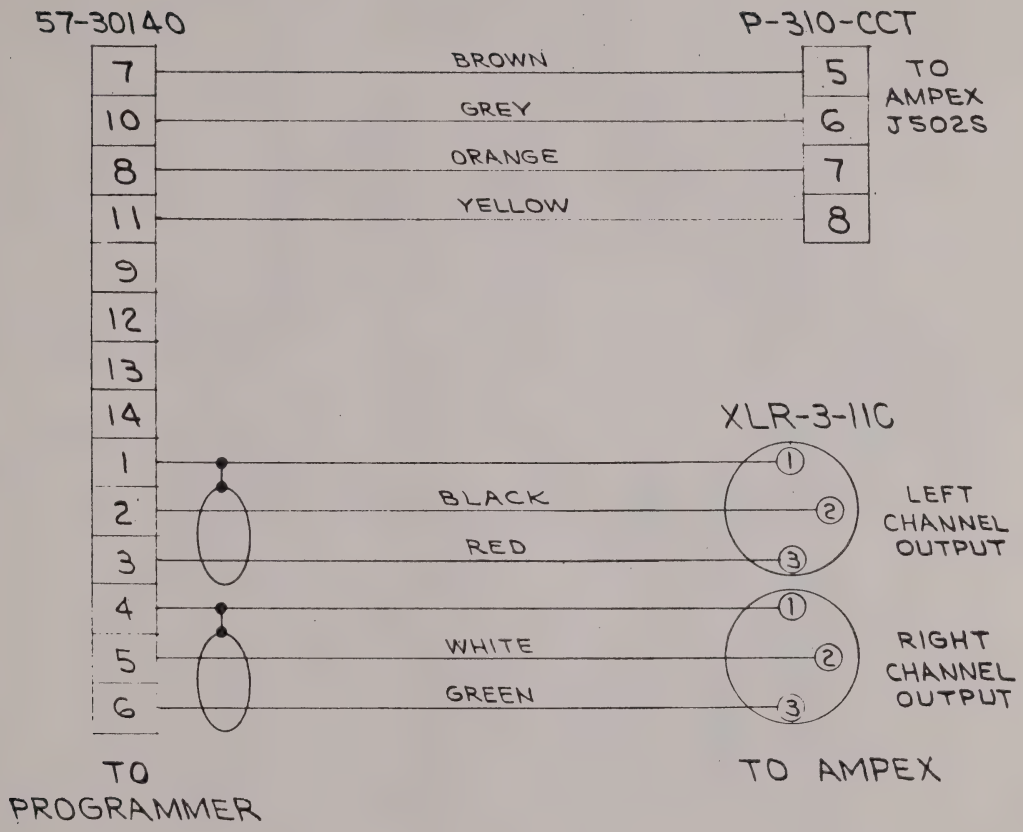
CONNECTING CABLE AA-1053-2 SCHEMATIC

REV. 5-15-66
6-1-66



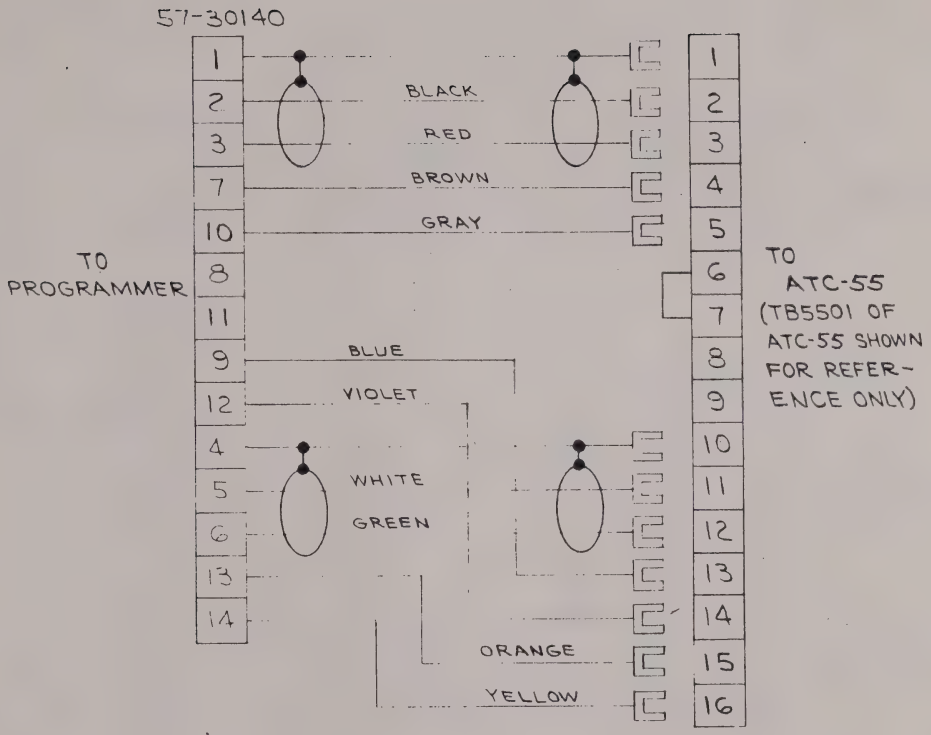
CONNECTING CABLE AA-1053-5 SCHEMATIC

REV. 6-1-66



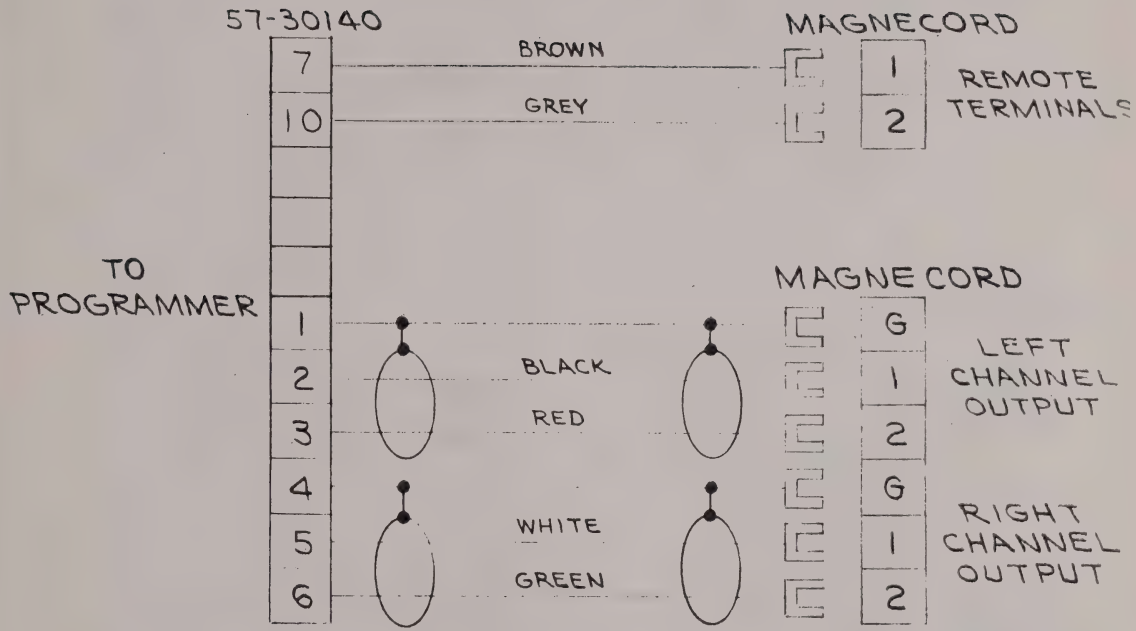
CONNECTING CABLE AA-1053-6 SCHEMATIC

REV. 5-17-66
6-1-66



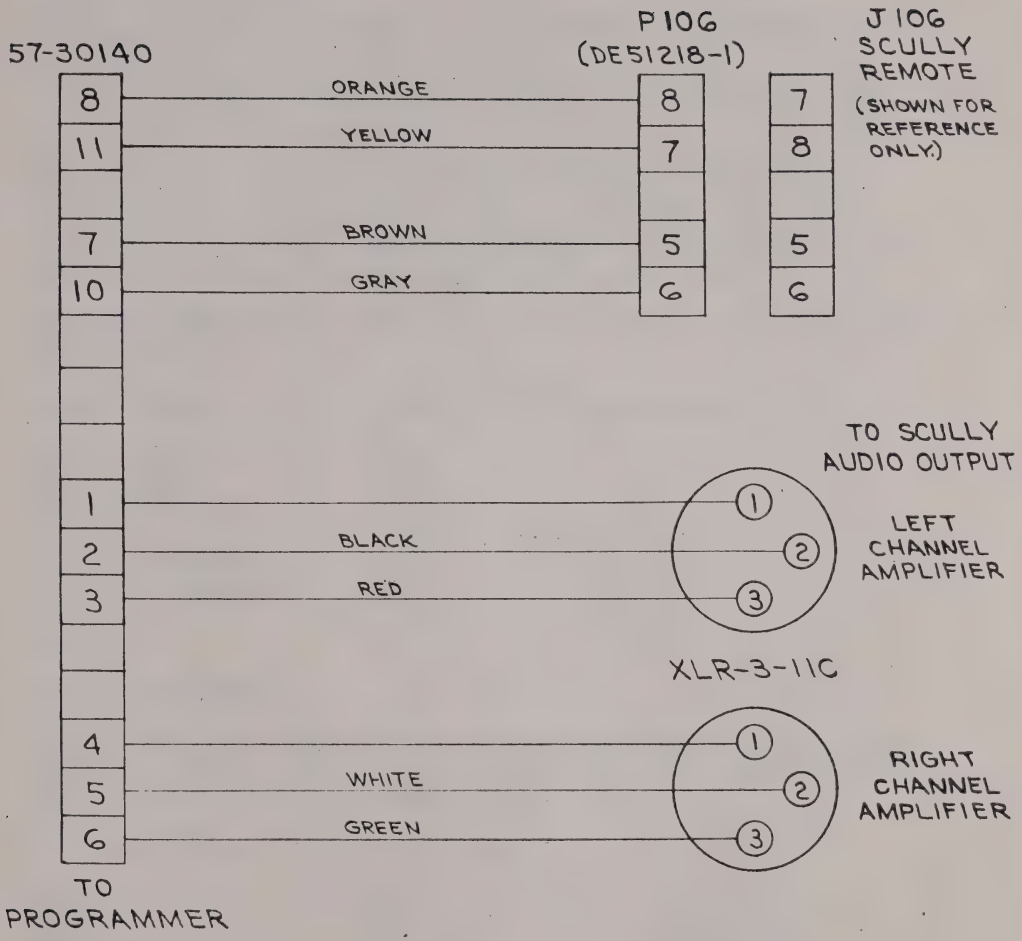
CONNECTING CABLE AA-1053-8 SCHEMATIC

REV. 4-28-66
5-15-66
6-1-66



CONNECTING CABLE AA-1053-10 SCHEMATIC

REV. 6-1-66



CONNECTING CABLE AA-1053-280 SCHEMATIC

SECTION 3

OPERATING PROCEDURE PROGRAMMER SC-48

GENERAL: The SC-48 Programmer is a forty-eight position sequential programmer with the ability to be automatically advanced to a predetermined point upon command of time. This will be referred to as SKIP. The Skip function is controlled by a momentary short from a time source such as the SC-48 Time Pulse Generator. The Skip may be controlled in one of two ways. The Skip may be armed, in which case the actual skip will occur at the conclusion of the source which is playing at the time of arming. If the system contains a Fade Start Unit, the time pulse would cause the Fade Start unit to fade the source playing. The Fade Start Unit, at the conclusion of the fade, will signal the programmer to skip immediately.

SEQUENTIAL PROGRAMMING: Assume a system consisting of the following program sources:

Program Source	Use	Source Number
Reel-to-Reel	Music	1
Reel-to-Reel	Music	2
Reel-to-Reel	Music	3
ATC-55	Spots	6
Criterion Playback	ID's	7
Criterion Playback	News	8

SECTION 3

OPERATING PROCEDURE

Set the START-OFF switch to OFF. Set the ARM-De ARM switch to De ARM. PRESS THE ADVANCE - SKIP switch to the SKIP position, repeat pressing this switch until the #1 indicator light is on.

Set the thumbhweel switches as follows:

Switch 1	to	Position 1
Switch 2	to	Position 2
Switch 3	to	Position 3
Switch 4	to	Position 6
Switch 5	to	Position 1
Switch 6	to	Position 2
Switch 7	to	Position 6
Switch 8	to	Position 7
All Others	to	Position 0

SECTION 3

OPERATING PROCEDURE

Momentarily press START-OFF switch to START and then let it return to the intermediate (middle) position. The program sequence will proceed as selected by the thumbwheels; sources 1, 2, 3, 6, 1, 2, 6 and 7 respectively. This sequence will repeat until changed.

At this point the Programmer is functioning only as a sequential device, and time has no influence on this type of operation.

SKIP PROGRAMMING: In the preceding example format, there was no provision for maintaining time accuracy. The example below utilizes the skip section of the SC-48. This programming method relieves the operator of time difficulties.

Switch S60, as in the preceding example, should be OFF. Set the START-OFF switch to OFF. Press the ADVANCE-SKIP to the skip position, repeat pressing this switch until the #1 indicator light is on. Set the ARM-De ARM switch to the center position.

Slide the unit a few inches out of the case. Set S52 and S56 in the ON position. Set S53, S54, S57, S58 and S59 in the OFF position. Setting the SKIP CONTROL switches to the above positions will divide the 48 selectors into two groups of 24. If smaller divisions of selectors is required, reflecting a more frequent SKIP, more switches would be placed in the ON position.

SECTION 3

OPERATING PROCEDURE

It will be assumed that the time device will provide SKIP ARM information 2 minutes prior to each hour and half hour.

Set the thumbwheel switches as follows:

START TIME	SWITCH NUMBER	SWITCH SETTING	TYPE OF PROGRAM
00:00	1	5	ID
00:15	2	4	SPOT
01:15	3	1	Music
03:30	4	2	Music
07:45	5	3	Music
10:00	6	1	Music
12:15	7	2	Music
14:15	8	4	SPOT
15:45	9	3	Music
18:30	10	1	Music
21:00	11	2	Music
25:30	12	3	Music
27:45	13	1	Music
NOTE: ARMING TAKES PLACE AT 28:00			
SKIP	14	2	Music
SKIP	15	3	Music
SKIP	16	1	Music
SKIP	17	2	Music
SKIP	18	3	Music
SKIP	19	1	Music
SKIP	20 - 24	0	Automatic by-pass
30:15	25	5	ID
30:30	26	4	SPOT
31:30	27	2	Music
33:45	28	3	Music
35:00	29	1	Music
38:15	30	2	Music
40:00	31	3	Music
42:30	32	1	Music
44:15	33	4	SPOT
46:30	34	2	Music
48:45	35	3	Music

51:45	36	1	Music
55:00	37	2	Music
57:15	38	3	Music
NOTE:	ARMING TAKES PLACE AT 58:00		
SKIP	39	1	Music
SKIP	40	2	Music
SKIP	41	3	Music
SKIP	42	1	Music
SKIP	43	2	Music
SKIP	44	3	Music
SKIP	45 - 48	0	Automatic By-Pass

It will be noted in the above example program pattern that a SPOT is programmed at the 15 minute points. The time which the SPOTS will play is approximate since they are programmed as part of the sequential pattern. Also note that the time at which the ID and SPOT plays on the hour and half hour is approximate, since their start time is dependent on the running time of the preceding music source at the time of arming.

If the music source playing at the time of arming were faded and an immediate skip initiated, exact time correction would be realized. This may be accomplished by the addition of a Fade Start Unit and individual 25 cycle detectors on the reel-to-reel sources.

ALTERNATE MUSIC PROGRAMMING METHOD: A cue signal is usually placed at the end of each recorded music selection. It may be desirable for the system to disregard these signals and continue programming for extended periods of time from one reel of music. This is accomplished by placing S60 in the OFF position. The same reel will then continue to play until the SKIP function has been armed. The benefit of the alternate programming method is conservation of thumbwheel selectors. This conservation would in turn afford the possibility of increasing the number of SKIP points from two, as in the above example, to as high as eight, which would result in four hours of programming. In this case each hour could have a different program pattern.

It should be remembered that an endless variation in programming is possible. The examples given are intended only to introduce the procedure used in operating the SC-48 Programmer.

SECTION 3

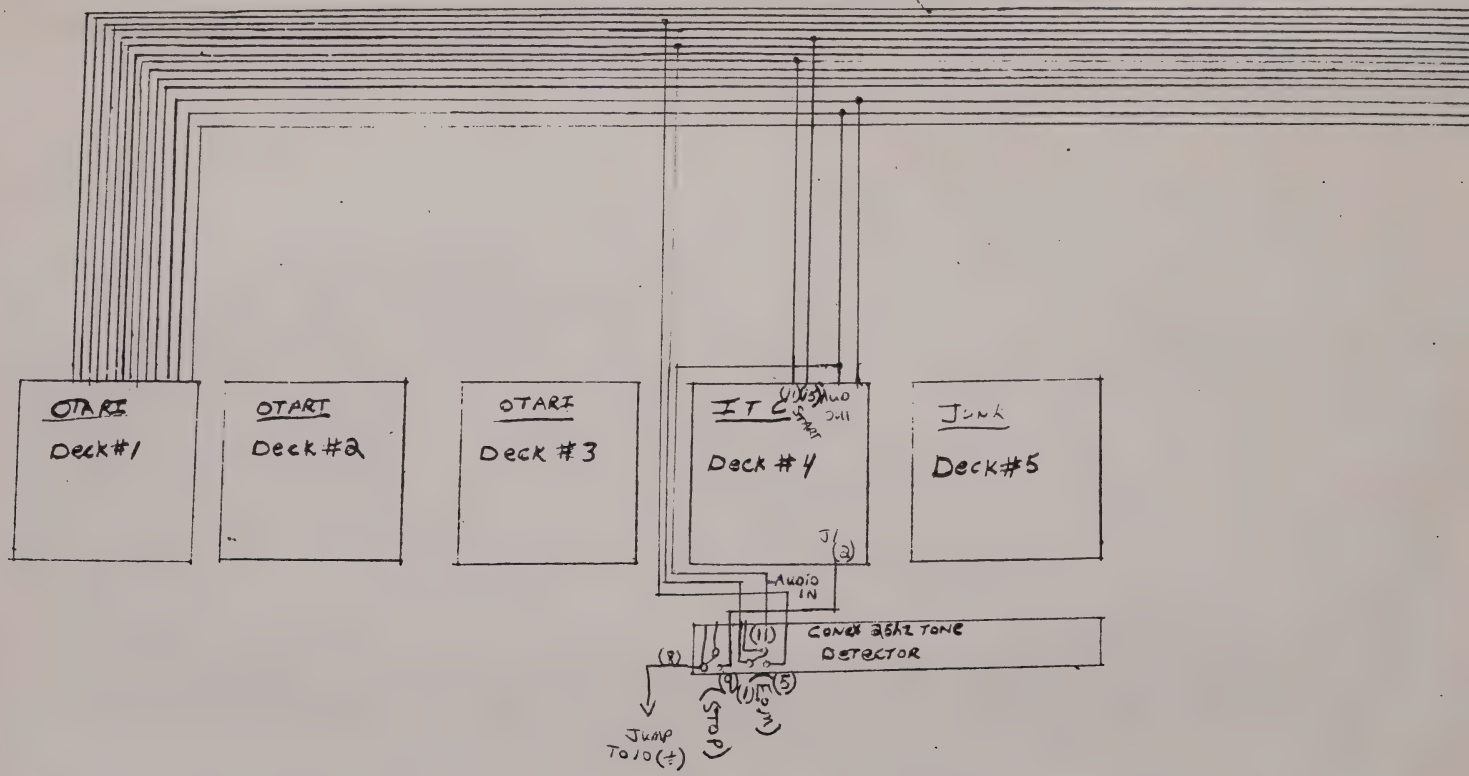
OPERATING PROCEDURE

PRODUCTION OF PROGRAM MATERIAL: It is obvious that all program material recorded for use in automation systems must provide an "end of message" signal for use as "start" information to the program source which is to follow. Cartridge machines provide this information by means of a Secondary Cue signal recorded on the cue track. Reel-to-reel machines commonly utilize a sub-audible tone burst as an "end of message" signal. This tone burst usually 25 cps is recorded on the program track. The SC-48 Programmer utilizes this burst to provide a START signal to the "next source" and a STOP signal to the source which was running. The running source is thus left in a cued position.

One 25 cps Detector Unit ordinarily continuously monitors the entire system, waiting for a switching command. There is, therefore, some danger of accidentally switching on random 25 cps program material. It is highly recommended that all recorded material be produced using a 25 cps filter on the input of the recording equipment. This will remove the greatest single source of switching difficulties. CAUTION: Identical filters should be placed in BOTH channels of a stereophonic system even though only one channel is monitored. Undesired phase shift between channels will otherwise result.

Proper operation of the SC-48 Programmer, when using reel-to-reel machines, depends upon correct placement of the 25 cps cue burst. The END of the cue burst signals the Programmer to stop the running source and to start the next programmed event. The reaction time of the Programmer to these switching signals is approximately one-half second. It is therefore necessary to leave in excess of one-half second of unrecorded tape after each cue burst. In some cases it may be desirable to record several selections before inserting a cue burst. One reel would then continue to run through several selections before switching to a new source.

The reel recording process should not be stopped, once started, unless absolutely necessary. Most reel-to-reel machines will record a transient as the bias oscillator is started or stopped.


OTARI
Deck#1
OTART
Deck#2
OTARI
Deck #3
ITC
Deck #4
JUNK
Deck#5
AUDIO IN
CONEX 3.5kHz TONE DETECTOR
JUMP TO 10(±)
(STOP)
(10 IN)

SECTION 3

OPERATING PROCEDURE

CUE BURST GENERATOR: No sub-audible Cue Tone Standards exist at the present time. The lack of such Standards has caused considerable confusion among producers of program material. ATC recommends, and uses, a 25 cycle-per-second (plus or minus 1 cycle-per second) burst. This burst is recorded at a level 5 db below the zero program reference level. Connection of the cue burst generator to the production equipment should be made in such a way that the cue level is always the same regardless of program level settings.

CUE BURST PLACEMENT AND DURATION: The SC-48 Programmer will (except on special order) start the "next source" at the END of the cue burst. It is therefore desirable to start the burst just prior to the end of the material being recorded. Anticipation, in some cases, of the end of such material may be difficult; however, the duration of the pulse is relatively unimportant, and the "leading edge" of the burst may be started well ahead of the actual program end. The only requirement of the cue burst is that it be of sufficient duration to permit the Detector to discriminate between a true cue signal and random program content; a minimum of one second is recommended.

CARTRIDGE PRODUCTION: Cartridge Secondary (end of message) Cue signals should be placed immediately after the end of program material.

DEFINITIONS: Certain terms to be used in Section 4 are defined as follows:

SEQUENTIAL PROGRAMMING: The consecutive playing of program sources as called for by the thumbwheel switches.

TIME PULSE GENERATOR: An external device which furnishes time information to the programmer.

SKIP ARM: The alerting of "SKIP CIRCUITS: by the Time Pulse Generator.

SKIP PROGRAMMING: The same as Sequential programming but with addition of automatic rejection of music program sources which were programmed into the sequence, but not needed to fill a time segment.

BATTERY: The positive side of the relay power supply. The negative side of this supply is at ground.

SENSOR: A device for detecting the end of program material. Usually a 25 cps detector-control unit for use with reel-to-reel music.

GENERAL CIRCUITRY: The SC-48 Programmer is a sequential programmer with 48 thumbwheel switches used to establish the pattern in which program sources are to be played.

A program source is connected to the system by energizing one of relays K1 thru K9. These relays are controlled by stepping switch RS1 (levels 3 and 4) and the thumbwheel switches. Contacts 1 thru 48 of RS1 (levels 3 and 4) are connected to the common terminals of switches S1 thru S48 respectively. Each switch is capable of routing control voltage (battery) to any one of the nine source relays. The proper relays are selected by setting the switches to the desired source numbers. Example: Assume RS1 is on position 1 and the first thumbwheel switch (S1) is also on 1. Battery is applied to K1 thru S1 contact 1, RS1 level 3 contact 1, contacts 6 and 10 of K10 which is energized while system is in operation, and contacts 1 and 9 of K12.

STEPPING SWITCH RS 1: It should be remembered that the coil of the stepping switch must be energized and then released before a position advance takes place. However, the interrupter springs are actuated as the coil is energized.

RELAY K11: The purpose of relay K11 is to provide an output pulse of a consistently definite length regardless of the duration of the input pulse. K11 is energized thru C3 and thus the pulse duration is always determined by the charging time of this capacitor; contacts 6 and 10 assure this action even though the input pulse is extremely short. C3 is discharged thru R3 and CR14 when (a) K11 has released and (b) the energizing voltage is removed.

SECTION 4

PRINCIPLES OF OPERATION

Relay K11: K11 is the master STOP PULSE relay. Contacts 6 and 10 of K11 operate relay K16 and contacts 1, 9, and 5 provide a pulsing network to START PULSE relay K15. Contacts 3 and 11, and 4 and 12 of K11 furnish a STOP pulse for Sources 1 and 2.

Relay K16: Contacts 12 and 8 operate K12 and K13. Contacts 9 and 5, and 6 and 10 serve as the ADVANCE circuit for stepping Switch RS1.

Relays K12 and K13: Contacts 9 and 1 of K12 supply holding voltages for relays K1 through K9. All other contacts on K12 as well as all contacts on K13 furnish a STOP pulse to Program Sources 1 through 7.

NOTE: Not all program Sources utilize this STOP pulse as stated in Section 2.

RELAY K10: K10 performs the function of stopping the system. Battery is applied to K10 through S49 Section A and remote system stop terminals 10 and 11 of J10 (which are strapped). If S49 is OFF, the above circuit is interrupted, but a holding circuit exists through contacts 8 and 12 of K10, contacts 1 and 9 of K16, and terminal 24 of J10 to battery. This circuit is present until K11 is pulsed by an "end of message" signal from a program source; thus, it is assured the system will not stop during play of a source.

RELAY K15: K15 is the START PULSE generator. Capacitor C1 is charged as Stop Pulse relay K11 operates. K15 is momentarily energized after K11 releases by the discharge of C1 through its coil. Contacts 5 and 9 transmit a Start Pulse to the main "start bus" and thus to the source which has been set up by RS1 and one of the source relays. Contacts 6 and 10 cause the Decoder, in systems which have Automatic Logging, to be activated. Contacts 3 and 11 are part of a locking circuit for K14. Contacts 7 and 11 furnish battery to TP1 when K15 is operated (See Re-Entry Unit Instruction Manual). Contacts 12 and 8 terminate in J12 pins 10 and 11, and provide the Fade Release circuit. NOTE: Not all program sources utilize the Start pulse generated by K15 (See Section 2).

RELAY K14: K14 is the SKIP ARM relay. K14 is energized by any one of five circuits; placing a short at terminals 8 and 9 of J12 (this normally connects to a Time Pulse Generator), placing a short at terminals 20 and 21 of J10 (remote ARM circuit), shorting terminals 6 and 7 of J12 (Connects to a Fade Start Unit), pressing S51A to the ARM position, and by pressing S50C to the SKIP position. K14 is locked by battery through S50 Section B, contacts 3 and 11 of K15, and contacts 8 and 12 of K14. K14 is de-energized by contacts 3 and 11 when K15 is energized, or by pressing S51B to the DE-ARM position, or by opening the normally strapped terminals 22 and 23 of J10.

SECTION 4

PRINCIPLES OF OPERATION

SOURCE STOP CIRCUITS: Explanation of the SC-48 is simplified by next considering the STOP circuits. Assume the following conditions:

1. Sequential programming.
2. Program Source 1 is an ATC Criterion Playback.
3. Program Source 2 is a Scully reel-to-reel.
4. Thumbwheel Switch 1 is in position 1.
5. Thumbwheel Switch 2 is in position 2.
6. All other thumbwheels in 0 position.
7. Rotary stepper RS1 in position 1 (K1 energized).
8. Program source 1 is running.

The Criterion playback "end of message" relay will provide a momentarily closed circuit at pins 9 and 12 of J1. Pin 12 is being furnished battery from the coil of K1, therefore battery continues from pin 9 thru CR21 to K11. K11 pulses, during which time battery is supplied to K12, K13 and RS1. RS1 does not advance until K11 releases, however, K1 released when K13 became energized. Relays K11, K12 and K13 transmit STOP signals to all nine sources (only one was running) thru pins 8 and 11 of J1 thru J9.

RS1 advances to position 2 and K11 releases, K2 is energized, source 2 is then connected to the system and is ready to receive a START signal.

START CIRCUITS: As K11 pulsed, capacitor C1 charged thru contacts 9 and 5. Upon release of K11, capacitor C1 momentarily energized K15 by discharging thru its coil. K15 transmits a start signal to the START BUS connected to contacts 5 and 9 and thus to Program Source 2 as set-up by the stepper.

NOTE: Section 2 described the method of strapping terminals A-B-C of each program start circuit. An A-B strapped source (Such as Magnecord) does not utilize the above START pulse, but does utilize continuous RUN information being provided by contacts 7-11 and 8-12 of the source relay.

SELECTOR SWITCH ZERO POSITION SKIP: Upon play completion of Program Source 2 (Scully) a 25 cycle tone will be detected. A pulse, from the Sensor, will be transmitted via pins 6 and 7 of J14 thru S60 (in the ON position) and thus to ADVANCE relay K11. K11 will cause RS1 to advance to position 3 where it connects to selector 3. Switch 3 is set to zero, as are all switches except 1 and 2. Battery is immediately fed thru K12 contacts 1 and 9, K10 contacts 6 and 10, RS1 level 3 and 4, S3 contact 0, CR24, RS1 interrupter springs (INT.S.) 3 and 4 and to the coil of RS1. This will cause RS1 to step to position 4.

SECTION 4

PRINCIPLES OF OPERATION

SELECTOR SWITCH ZERO POSITION SKIP: At position 4 battery is again applied and another self-step occurs. This same action takes place until the stepper arrives at a position where the interrupter springs do not see battery. (NOTE: This skipping action automatically takes place thru unused positions 49, 50, 51 and 52.) A circuit also exists thru CR25 to K15. During the time RS1 is advancing thru selectors which have been set to 0, battery is supplied to the START relay K15. This extends the duration of the START pulse until the stepper has arrived at an active thumbwheel selector. Source relay K1 is again energized as RS1 arrives at position 1; source 1 receives a START pulse and the programming sequence repeats.

SKIP PROGRAMMING: Relay K14 is the Skip Arm relay. The primary purpose of K14 is to channel Advance information into one of two places. If K14 is not energized, the Advance information which originates at contacts 6-10 of K11, is channeled to RS1 thru contacts 3 and 11 of K14 and causes the stepping switch to Advance. If K14 is energized, the Advance circuit is now directed thru contacts 11 and 7 of K14, to RS1 level 5 and 6, to CR16 and CR17. First, follow the circuit thru CR17 to the interrupter springs and to the coil of RS1. This circuit causes the stepping switch to self step until it reaches an open circuit which is set up by opening any of the Skip Control Switches S52 thru S59. The circuit thru CR16 causes K11 to remain energized while RS1 is self stepping to its Skip position. Contacts 3 and 11 of START relay K15 release the Skip Arm relay.

SKIP PROGRAMMING AFTER A FADE: During a SKIP ARM program pattern the SKIP function does not occur until the presence of the "end of message" from the source which was playing at the time of arming. If a Fade Start is contained within a system, the Time Pulse Generator would signal the Fade Start Unit. This would fade the source playing and at the conclusion of the Fade, place a short at terminals 6 and 7 of J12. The circuit thru CR22 energizes the SKIP ARM relay K14. The circuit thru CR23 supplies ADVANCE information. Thus, causing an immediate SKIP occur.

SWITCH S60: With switch S60 in the OFF position the "end of message" pulse from the SENSOR is disabled until the skip arm relay K14 is energized. This permits continuous running of one music source until time arrives (K14 contacts 5 and 9 close) for a SKIP to take place.

SECTION 4

PRINCIPLES OF OPERATION

STEPPER SKIP: Pressing S50 to the Skip position causes the Skip Arm relay to energize and the Advance relay to energize. RS1 will self-step to a Skip position. Placing the Skip Control Switches, S52 thru S59, in the ON position establishes skip points. Placing S52 and S56 in the ON position will divide the 48 thumbwheel switches into two groups. Selector switch 1 and 25 will be the Skip points.

STEPPER ADVANCE: Pressing S50 to the Advance position will cause RS1 to advance one position. Battery will be applied to K11 thru S50 section A. K11 contacts 6 and 10 pulse K16 and contacts 5-6 and 9-10 of K16 pulse RS1.

MANUAL START: A Manual START pulse may be generated by momentarily pressing S49 to the START position. START relay K15 is energized thru S49 section B.

NOTE: As previously stated, some types of reel-to-reel machines do not utilize this pulse.

POWER SUPPLIES: The SC-48 Programmer contains two dc power supplies. One is used for stepping switch RS1 and all other relays. The second power supply furnishes power for the Sensor. The secondary windings of the power transformers are connected in parallel for load equalization.

LAMPS: Lamps I1 thru I48 are switched by level 1 and 2 of RS1. These lamps indicate the position in the program sequence. Lamp L49 indicates "Skip Arm" and is switched by contacts 6 and 10 of relay K14.

SECTION 5

MAINTENANCE SC-48 PROGRAMMER

CONTROL RELAYS: All control relays are equipped with dust covers which should always remain in place. Any burnishing of contacts should be performed with a contact burnishing tool. Under no circumstances should a file or any rough abrasive be used.

STEPPING SWITCH: The stepping switch should require no maintenance. The frequency of use in the Programmer is far below the use capability of the stepper.

LAMPS: The indicator lamps are of the neon type equipped with an internal dropping resistor. Connections to these lamps are made by means of slide-on connectors.

POWER SUPPLIES: The relay power supply voltage may be measured across capacitor C5 and should be approximately 36 volts. The Sensor power supply voltage may be measured across C2 and should be within 5% of 24 volts.

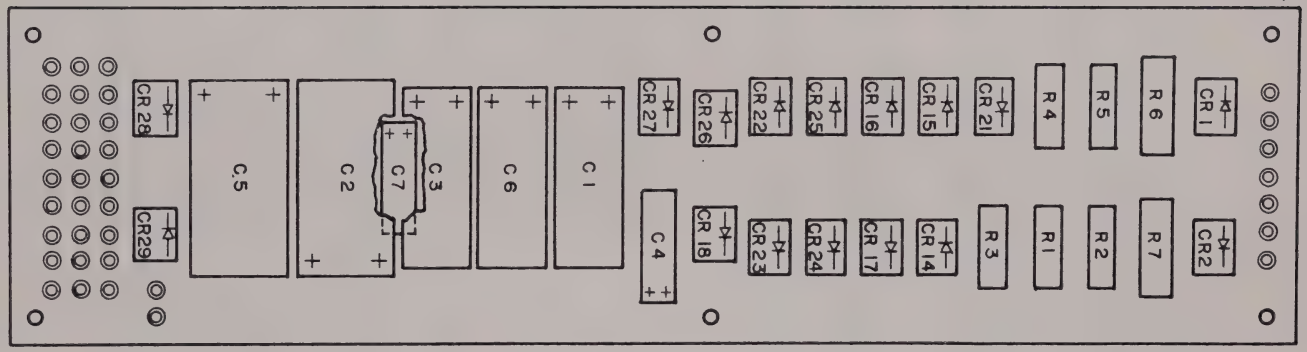
SECTION 6

PARTS LIST — SC-48 PROGRAMMER

Component	ATC Part	Description
C1	12-5215	CAPACITOR, 150 mfd, 50 vdcw
C2	12-5251	CAPACITOR, 500 mfd, 50 vdcw
C3		Same as C1
C4	12-5135	CAPACITOR, 30 mfd, 50 vdcw
C5		Same as C2
C6		Same as C1
C7		Same as C1
CR1	14-1010	DIODE, Silicon, 1N3254
CR2		Same as CR1
CR3		Not used
CR4		Same as CR1
CR5 thru CR29		Same as CR1
F1	19-2001	FUSE, 1. amp, SLO-BLO
I1 thru 149	15-5003	LAMP, Neon, Dialco 45H-22K
J13	16-1004	JACK, Headphone, Stereo
K1 thru K16	21-1031	RELAY, 24 vdc, 4P.D.T.
R1, R2	11-2010	RESISTOR, 10 ohm, 1 watt, 10%
R3	11-2090	RESISTOR, 1000 ohm, 1 watt, 10%
R4, R5	11-1170	RESISTOR, 56K ohm, 1/2 watt, 10%
R6	11-3035	RESISTOR, 100 ohm, 2 watt, 10%
R7	11-4150	RESISTOR, 500 ohm, 5 watt, 10%
RS1	21-3003	SWITCH, Rotary, AE PW-106105GHAB, Modified
S1 thru S24	18-4010	SWITCH ASSEMBLY, GE CR103FX10AA
S25 thru S48		Same as S1 thru S24
S49 thru S51	18-2004	SWITCH, Lever, Switchcraft 160312
S52 thru S59	18-3001	SWITCH, Toggle, S.P.S.T.
T1, T2	25-3008	TRANSFORMER, Power, 24-0-24 v., 1 amp.
T3, T4	25-2006	TRANSFORMER, Audio, 600 ohms to 600 ohms

5860054 126 02

NOTE: See Section 7 for Model SDU Detector Parts List



SC-48 COMPONENT BOARD

AD-1054

MODEL SDU DETECTOR

SECTION 7 DESCRIPTION

GENERAL: The Model SDU Detector is a 25 cps tone sensing detector designed for use with the ATC SC-48 System Programmer. It will detect the presence of 25 cps tone signals which have been recorded on the program track of reel-to-reel machines. These signals are used as system control information.

The SDU Detector is a plug-in device and is powered from the Programmer with which it is associated. One bridging audio input is used for monitoring a monophonic system or the left channel of a stereophonic system.

INSTALLATION: The SDU Detector is plugged into chassis connector J14 of the Programmer. The Programmer AC power should be disconnected when the Detector is being installed or removed.

All connections to the Detector are made through connector P101. Circuits to this connector are as follows:

Pin 1 Audio Input
Pin 2 Ground
Pin 3 -24 volts to Amplifier
Pin 4 To battery through current limiting resistor R2 (See Note 1)
Pin 5 To capacitor C6 (See Note 1)
Pin 6 To battery (+36 volts)
Pin 7 To System "end of message" circuit
Pin 8 To Ground
Pin 9 Not used
Pin 10, 11, 13, 14 See Note 2
Pin 12, 15 Provide a closed circuit during tone burst. See Note 3

Note 1: R2 and C6 are Programmer components.
Note 2: Pin 10 is strapped to Pin 13, Pin 11 is strapped to 14. These circuits are not used in the SC-48.
Note 3: Used for special applications only.

ELECTRICAL: The "tone" section of the SDU Detector is a highly selective amplifier achieved through the use of a sharply tuned 25 cps network in a feedback loop. Q101 then conducts and relay K101 is energized for the duration of the burst. Contacts on K101 provide a charging circuit for capacitor C7. Upon completion of the burst, K101 releases and C7 is discharged through K102. K102 is energized momentarily and closes a set of contacts which provide a "next source" start circuit at pins 6 and 7 of P101.

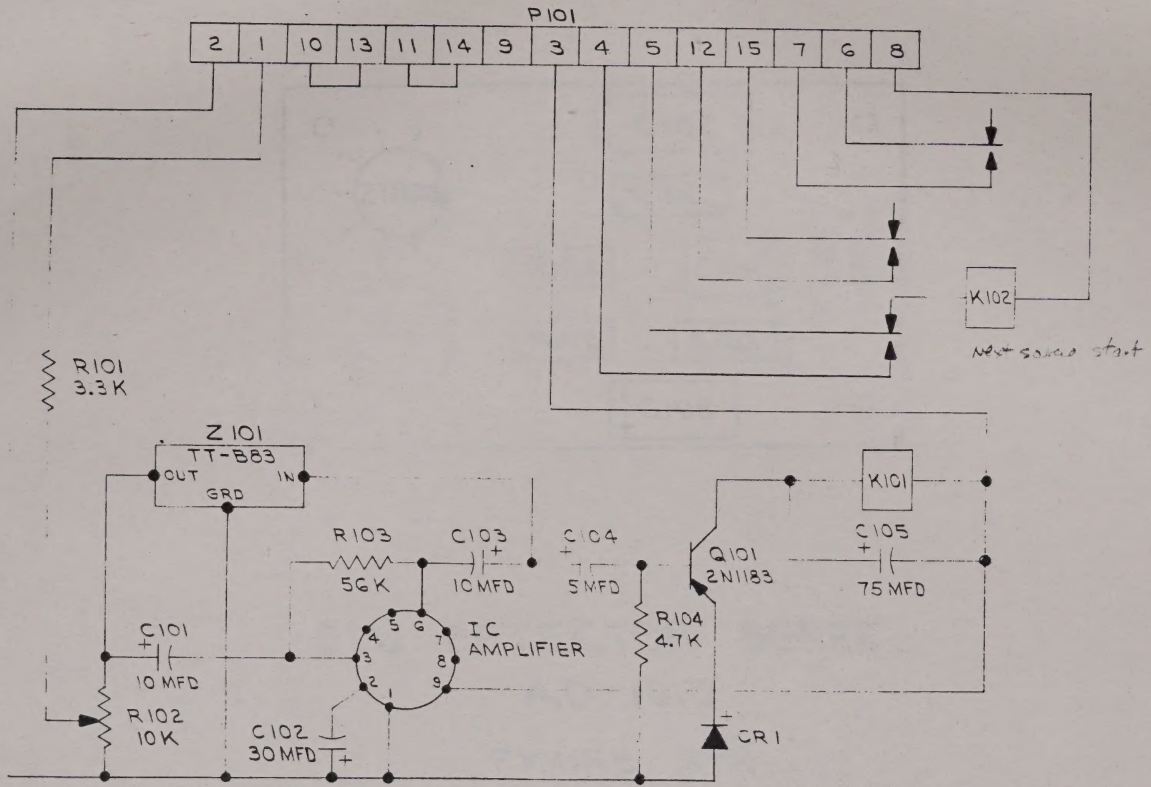
SECTION 7

MODEL SDU DETECTOR

ADJUSTMENTS: The only adjustment for the SDU Detector is the setting of sensitivity control R102. The input to the Detector must be between -20 and +18 dbm. The sensitivity should be set at a point which is 6 db MORE SENSITIVE than the minimum level requirement. Assume the 25 cps cue burst is normally recorded 5 db lower than the zero program reference level (-5 VU). The sensitivity control can then be adjusted to the point where the Detector is activated when the test burst is reproduced. In no case should the sensitivity be advanced to the point where K101 will energize on program material.

PARTS LIST:

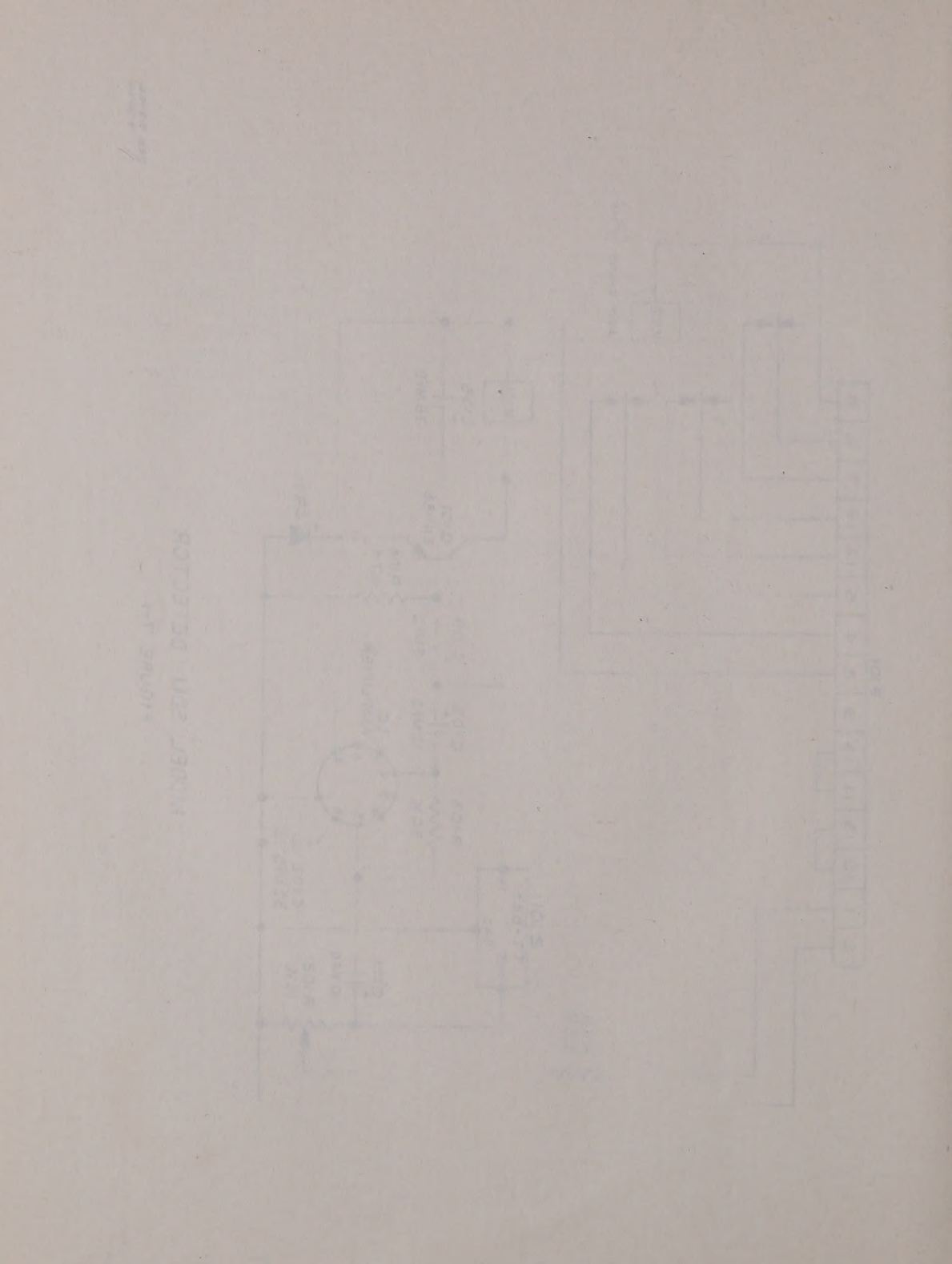
Component	ATC Part	Description
C101	12-5110	CAPACITOR, 10 mfd, 25 vdcw
C102	12-5135	CAPACITOR, 30 mfd, 50 vdcw
C103		Same as C101
C104	12-5105	CAPACITOR, 5 mfd, 25 vdcw
C105	12-5175	CAPACITOR, 75 mfd, 25 vdcw
CR1	14-1010	DIODE, 1N3254
IC	20-3007	AMPLIFIER, Nucleonics 614-A
K101	21-1032	RELAY, Comar 2 P.D.T.
K102	21-1031	RELAY, Comar 4 P.D.T.
P101	16-3015	PLUG, CJ P-315AB
Q101	14-2003B	TRANSISTOR, 2N1183
R101	11-1115	RESISTOR, 3.3K, ½ watt, 10%
R102	11-6030	RESISTOR, variable, 10K, linear
R103	11-1170	RESISTOR, 56K, ½ watt, 10%
R104	11-1120	RESISTOR, 4.7K, ½ watt, 10%
Z101	20-3001	FILTER, TT Electronics, TT-B83

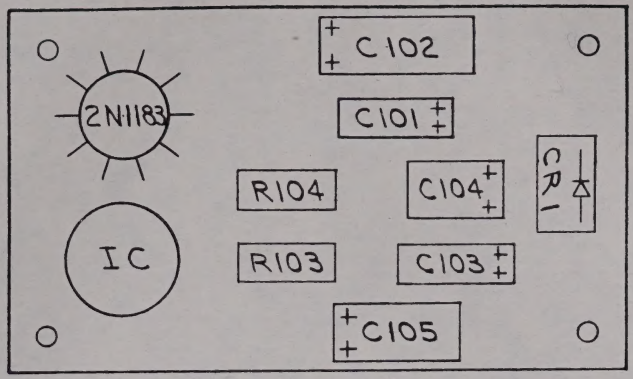


MODEL SDU DETECTOR

FIGURE 7-1

REV. 5-31-66
9-30-66





SDU DETECTOR BOARD
AD-1010

FIGURE 7-2

REV. 9-30-66

C102
C104
C105
C106
C107
C108
C109
C110
C111
C112
C113
C114
C115
C116
C117
C118
C119
C120
C121
C122
C123
C124
C125
C126
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C140
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C142
C143